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IS 4060 (1994): Automotive vehicles - Flashers for direction indicators [TED 11: Automotive Electrical Equipment]



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(दूसरा पुनरीक्षण)

Indian Standard

AUTOMOTIVE VEHICLES — FLASHERS FOR
DIRECTION INDICATORS — SPECIFICATION

(Second Revision)

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**AMENDMENT NO. 1 JUNE 2011
TO
IS 4060 : 1994 AUTOMOTIVE VEHICLES — FLASHERS FOR DIRECTION
INDICATORS — SPECIFICATION**

(Second Revision)

[Page 2, clause 5.1.1(g)] — Add the following at the end:

‘h) Cold test (*see* 5.9).’

(Page 4) — Insert the following new sub-clause after 5.8:

‘5.9 Cold Test

5.9.1 The test shall be conducted in accordance with 4.4 of IS 10250.

5.9.2 At the end of the test, the flasher units shall satisfy the requirements of 5.5.2(a) and (b).’

Indian Standard

AUTOMOTIVE VEHICLES — FLASHERS FOR DIRECTION INDICATORS — SPECIFICATION

(*Second Revision*)

1 SCOPE

This standard specifies requirements and methods of tests for hot wires type flashers with a load of two lamps for direction indicators of automobiles having a 6 V, 12 V and 24 V direct current (dc) system. This is not applicable to two and three wheeled vehicles using ac flashers and vehicles with solid state flashers.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
1248 (Part 1) : 1983	Direct acting indicating analogue electrical measuring instruments and their accessories: Part 1 General requirements (<i>second revision</i>)
10250 : 1982	Specification for severities for environmental tests for automotive electrical equipment

3 TERMINOLOGY

For the purpose of this standard the following definitions shall apply.

3.1 Direction Indicator

A lighting device to show in which direction the driver intends to turn by giving a flashing light on that side of the vehicle towards which the turn is being made. The definition does not include:

- a) the switchgear,
- b) semaphore type indicators, and
- c) additional indicators.

3.1.1 Hazard Warning Indicator

It is a device which as long as in operation causes at least one signal lamp on the left and right to the front and left and right of the rear of the vehicles to flash simultaneously to indicate to the approaching vehicles, the presence of a hazard on the road.

3.2 Flasher (Flasher Unit)

It is a device designed to make the direction indicator unit flash intermittently at a specified frequency with driver of the vehicle intends to turn the vehicle to the right or to the left of his path.

3.3 Routine Tests

Tests carried out on each flasher to check requirements which are likely to vary during production.

3.4 Type Tests

Tests carried out to prove conformity with the specification. These are intended to prove the design characteristics of a given type of flasher.

3.5 Acceptance Test

Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

3.6 Defect

Failure to meet the requirement imposed on an item with respect to a single characteristic during production.

3.6.1 Critical Defect

A defect which is of a nature which prevents or stops the functions expected of the device.

3.6.2 Major Defect

A defect, other than critical defect which leads to a significant deviation in a parameter obvious without detailed measurements, or could lead to other more serious malfunctioning of the device.

3.6.3 Minor Defect

A defect, other than critical and major defect, which is a small deviation in a parameter not obvious unless especially measured or has little or no cumulative damaging effect on the device.

4 DESIGN AND CONSTRUCTION

4.1 The flasher shall have such a construction that if the filament of either of the two bulbs of the direction indicator is broken, the driver of the vehicle shall readily recognize it by means of a pilot lamp.

4.1.1 Flasher shall be of a design ensuring that the failure of the direction indicator lamp is indicated either by the failure of pilot lamp or by visible increase in flasher frequency of the pilot lamp or by continuous glowing of the pilot lamp.

4.2 The material used and workmanship in the construction of flashers shall be of such quality that provides adequate protection, in normal use, against mechanical and electrical failures and shall withstand the effects of changing weather conditions, water or

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excessive dampness, corrosion, dust, steam, oil, high temperature or any other deleterious influence to which they may be exposed under conditions of their normal use.

5 TESTS

5.1 Classification of Tests

5.1.1 Type Tests

The following shall constitute type tests:

- Visual examination (see 5.2),
- Performance test (see 5.3),
- Vibration test (see 5.4),
- Life test (see 5.5),
- Damp heat (cycling) test (see 5.6),
- Dry heat test (see 5.7), and
- Test for salt spray (see 5.8).

5.1.1.1 Criteria for approval

Forty-five samples shall be submitted for testing together with the relevant data. The testing authority shall issue a type approval certificate if the flashers are found to comply with the requirements of (a) to (c) of 5.1.1.2.

5.1.1.2 After visual examination all samples shall be subjected to the tests in the following manner:

- Performance test* — The performance requirements shall be based upon a test of 20 samples chosen at random. These samples shall be subjected to performance test (5.3). After the test, there shall not be more than 3 minor defects, 2 major defects and 1 critical defect.
- Endurance (life) test* — (see 5.5).
- Environmental test* — Five flasher units conforming to 5.3.2, 5.3.3, 5.3.4 and 5.3.5 shall be subjected to the tests as stated below:

Vibration test	2
Damp heat (cycling) test	1

Dry heat test	1
Test for salt spray	1

5.1.1.3 In case of failure of one or more type tests, the testing authority may call for fresh samples not exceeding twice the number of original samples and subject them to the test(s) in which failure occurred. If, in repeat test(s) no failure occurs, the test may be considered to have been satisfied.

5.1.2 Acceptance Tests

The acceptance tests shall constitute the following:

- Visual examination (see 5.2),
- Performance test (see 5.3), and
- Life test (see 5.4).

NOTE — The number of samples for acceptance tests shall be agreed upon between the purchaser and the manufacturer. However, the recommended plan of sampling is given in Annex A.

5.1.3 Routine Tests

The following shall constitute routine tests:

- Visual examination (see 5.2), and
- Performance test (see 5.3).

5.2 Visual Examination

All flashers shall be examined for finish and workmanship. The flashers including their electrical contacts shall be free from injurious flaws and defects.

5.3 Performance Test

5.3.1 Flashers to be tested shall be kept at 63°C for three hours before the commencement of the test.

5.3.2 Test Requirements

The flashers shall be mounted as specified by the manufacturer if special precautions are required. The flashers shall then be connected in a standard test circuit as shown in Fig. 1. The ripple content in the test voltage source shall not be more than 0.3 percent. Other provisions shall be as given in Table 1.

Table 1 Requirements for Performance Test
(Foreword, and Clause 5.3.2)

Rated Voltage	Voltage Range	Test Voltage	Circuit Resistance	Nominal Double Lamp Load	Pilot Lamp Load
Volts			Ohm	Watts	Watts
(1)	(2)	(3)	(4)	(5)	(6)
6	5.5 to 7.5	6.4 ± 0.05	0.1 to 0.2	36	1.2
12	11.0 to 15.0	12.8 ± 0.1	0.2 to 0.3	42	2.0
24	22.0 to 30.0	25.6 ± 0.2	0.3 to 0.4	42	3.0

NOTES

- The lower voltage and the higher voltage of the voltage range have been designated as 'A' volts and 'B' volts respectively in Annex B.
- The nominal double lamp load shall consist of two selected lamps checked for wattage at the rated voltage to achieve a total specified load for the unit under test.
- For hazard warning test, the loads shall be 84 watts for 12 V and 24 V systems respectively.

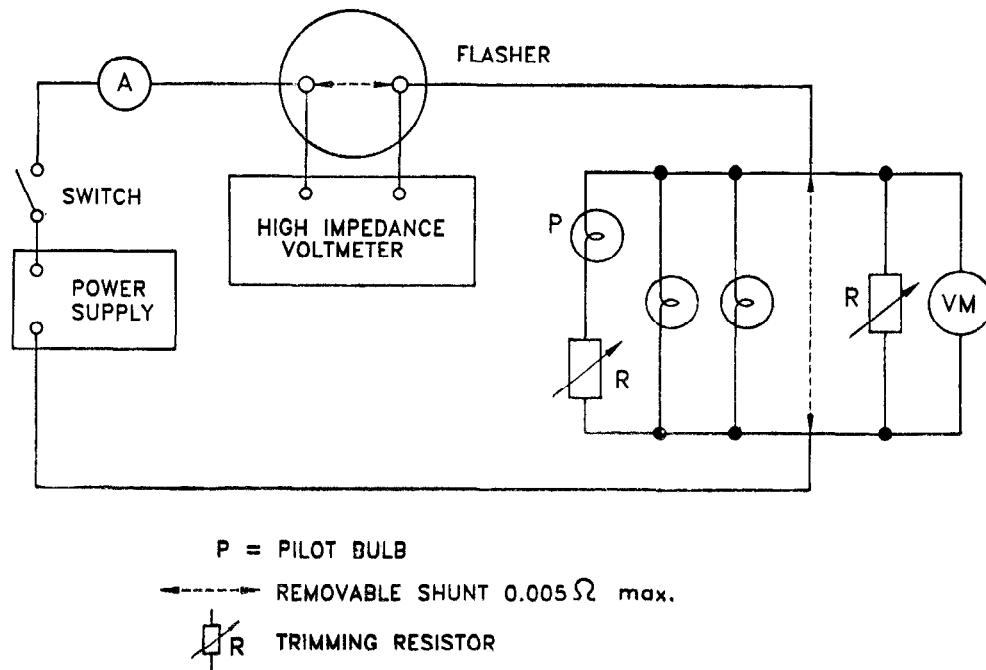


FIG. 1 STANDARD TEST CIRCUIT FOR FLASHERS

5.3.3 With specified test voltage V applied to bulb terminals, the flashing rates shall be within the limits of 70 to 100 flashes per minute. The test shall be carried out at a temperature of $27 \pm 2^\circ\text{C}$.

5.3.3.1 Within the voltage range the flashing rate shall be within the limits of 60 to 120 flashes per minute. The flashing rate shall be measured over a period of one minute.

5.3.3.2 The electrical measuring instruments used during the test shall at least be of accuracy class 1.0 as recommended in IS 1248 (Part 1) : 1983.

5.3.4 The ratio 'Time on' to 'Total cycle time' shall be 35 to 65 percent; the 'off' period shall then permit each lamp to fall to within 0 to 10 percent of its full design brilliance.

5.3.5 The voltage drop between input and output terminals of the flasher unit shall be less than 0.5 volts with appropriate lamp load and with contacts closed.

5.3.6 The time required before the flasher begins to work shall be not more than one second.

5.3.7 The load required for the flasher to start functioning shall not be less than 15, 18 and 21 watts for rated voltages of 6 V, 12 V and 24 V respectively.

5.4 Vibration Test

The vibration test shall be conducted in accordance with 4 of IS 10250 : 1982. The frequency, displacement amplitude and duration of test shall be as applicable for Group 2 category equipment.

At the end of the vibration test the test piece shall be examined. Any unit showing evidence of material defects, displacement or rupture of parts shall be considered to have failed. At the end of the test the flasher shall be able to operate for 60 to 120 flashes per minute when tested with appropriate voltage.

5.5 Endurance (Life) Test

5.5.1 Twenty flasher units conforming to 5.3.2 to 5.3.5 shall be selected for life test when carried out as type test. The test shall run on each flasher connected to an appropriate load and operated at 7 ± 0.25 V for 6 volts operation, 14 ± 0.5 V for 12 volts operation and 28 ± 1.0 V for 24 volts operation. For type test, the samples shall operate for a minimum of 500 hours cycling time, the cycle consisting of 2 minutes 'on' and 5 minutes 'off'. As an acceptance test, the duration of the life test shall be 100 hours continuous. The ambient temperature during this test shall be $27 \pm 2^\circ\text{C}$.

5.5.1.1 For assessment in hazard warning mode, the flasher shall be tested continuously for 36 hours.

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5.5.2 After completion of life test, the flasher units shall not have more than (i) two critical defects, (ii) three major defects, and (iii) five minor defects, when tested for requirement as mentioned below:

- a) The flashing rate shall lie within the limits of 60 to 120 flashes per minute when tested with the appropriate test voltage given in **5.3.2**.
- b) The ratio 'Time on' to 'Total cycle time' with the appropriate test voltage shall be within the limit 30 to 70 percent.

NOTE — The classification of critical, major and minor defects are given in Annex B.

5.6 Damp Heat (Cycling) Test

5.6.1 The damp heat (cycling) test shall be carried out according to **4.3** of IS 10250 : 1982.

5.6.2 The number of conditioning cycles shall be two.

5.6.3 Recovery

The recovery period shall be two hours.

5.6.4 Assessment

The flasher units when tested after recovery shall satisfy the requirements of **5.5.2(a)** and **(b)**.

5.7 Dry Heat Test

5.7.1 This test shall be conducted according to **4.2** of IS 10250 : 1982.

5.7.2 The test shall be carried out at a temperature of $70 \pm 3^\circ\text{C}$. The flasher shall be tested in the switched-off conditions.

5.7.3 The period of exposure shall be 24 hours.

5.7.4 The recovery period shall be 2 hours.

5.7.5 Assessment

The flasher units when tested after recovery shall satisfy the requirements of **5.5.2(a)** and **(b)**.

5.8 Test for Salt Spray

5.8.1 The salt spray test shall be carried out according to Appendix A of IS 10250 : 1982.

5.8.2 The temperature of the salt spray chamber shall be $27 \pm 2^\circ\text{C}$.

5.8.3 At the end of the test, the flasher units when tested shall satisfy the requirements of **5.5.2(a)** and **(b)**.

6 MARKING

6.1 The flashers shall be marked with the following details:

- a) Name and/or trade-mark of manufacture,
- b) Rated voltage,
- c) Rated load in W,
- d) Source of manufacture, and
- e) Month and year of manufacturer.

6.2 The terminals of the flasher shall be appropriately marked with the letter symbols *L*, *P*, and *B*, denoting lamp, pilot lamp and battery respectively. Additionally any numerical indication of circuitry which is connected to the unit may be provided. However, in case of two terminal flashers '*P*' shall not be marked.

6.3 BIS Certification Marking

The product may also be marked with the Standard Mark.

6.3.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(Clause 5.1.2)

RECOMMENDED PLAN OF SAMPLING

A-1 GENERAL

A-1.1 If statistical quality control techniques have been used for production control such test results and relevant charts may be made available along with the material supplied to enable the purchaser to judge the acceptability, or otherwise of a lot. In case such information is not available, the following procedure is recommended for judging conformity of a lot with the requirements of this specification.

A-2 SCALE OF SAMPLING

A-2.1 Lot

In any consignment, all the flashers of the same rating and from the same batch of manufacture shall be grouped together to constitute a lot.

A-2.2 The number of flashers to be selected from a lot shall depend upon the lot size and shall be in accordance with col 1 and 2 of Tables 2 and 3.

Table 2 Recommended Plan of Sampling Applicable to Visual Examination and Performance Test
(Clause A-2.2)

Lot Size N (1)	Sample Size n (2)	Permissible Number of Defectives		
		Critical (3)	Major (4)	Minor (5)
301 to 500	8	0	1	1
501 to 1 000	13	1	1	2
1 000 and above	13	1	1	2

NOTE — The sample size and permissible number of defectives for lot size up to 300 shall be as agreed upon between the manufacturer and the purchaser.

Table 3 Recommended Plan of Sampling Applicable to Life Test
(100 Hours Continuous)
(Clause A-2.2)

Lot Size N (1)	Sample Size n (2)	Permissible Number of Defectives		
		Critical (3)	Major (4)	Minor (5)
501 and above	13	1	1	2

NOTE — The sample size and permissible number of defectives for lot size up to 500 shall be as agreed upon between the manufacturer and the purchaser.

A-2.3 These flashers shall be selected at random. In order to ensure randomness, the following procedure may be adopted:

Arrange the flashers in a systematic manner and starting from any flasher count them as 1, 2, ..., etc, up to r , r being equal to the integral part of N/n , N being the lot size and n the sample size. Every r th flasher shall be included in the sample.

A-3 NUMBER OF TESTS

A-3.1 All the flashers selected under A-2.2 shall be subjected to acceptance tests given in 5.1.2.

A-4 CRITERION FOR CONFORMITY

A-4.1 A lot shall be considered as conforming to this specification, if the number of critical, major and minor defects does not exceed the corresponding number given in Tables 2 and 3.

ANNEX B

(Clause 5.5.2, and Table 1)

CLASSIFICATION OF DEFECTS

B-1 GENERAL

B-1.1 The possible defects as observed during tests

have been classified according to the seriousness of their nature. Table 4 shows the classification of defects found in performance and life tests.

Table 4 Classification of Defects
(Clause B-1.1)

Test	Critical Defects	Major Defects	Minor Defects
Performance	1.0 Main contact permanently 'ON'	1.0 Frequency	1.0 Frequency
		1.1 Frequency at specified voltage less than 60 flashes per minute	1.1 Frequency at specified voltage between 60 to 70 flashes per minute
	2.0 Main contact permanently 'OFF'	1.2 Frequency at specified voltage greater than 120 flashes per minute	1.2 Frequency at specified voltage between 100 to 120 flashes per minute
		2.0 Voltage range	2.0 Voltage range
	4.0 Pilot contact permanently 'ON'	2.1 Frequency at 'A' volt less than 30 flashes per minute	2.1 Frequency at 'A' volt between 30 to 60 flashes per minute
		2.2 Frequency at 'B' volts greater than 150 flashes per minute	2.2 Frequency at 'B' volts between 120 to 150 flashes per minute
	6.0 Pilot cointact operation erratic	3.0 Percentage 'ON' time	3.0 Percentage 'ON' time
		3.1 Percentage 'ON' to total cycle time less than 30 percent	3.1 Percentage 'ON' to total cycle time between 30 to 35 percent
		3.2 Percentage 'N' to total cycle time greater than 75 percent	3.2 Percentage 'N' to total cycle time between 65 to 75 percent
		4.0 Voltage drop	4.0 Voltage drop
		4.1 Voltage drop greater than 0.8 V	4.1 Voltage drop between 0.5 to 0.8 V
		5.0 Starting time	5.0 Starting time
		5.1 Starting time greater than 1.8 sec	6.0 Starting time between 1.0 to 1.8 sec
		6.0 Starting load	6.0 Starting load
		6.1 Starting load more than	6.1 Starting load more than
		a) 6 V Flasher 18 Watts	a) 6 V Flasher 15 to 18 Watts
		b) 12 V Flasher 21 Watts	b) 12 V Flasher 18 to 21 Watts
		c) 24 V Flasher 24 Watts	c) 24 V Flasher 21 to 24 Watts
Life Test (100 hours continuous)	1.0 Main contact permanently 'ON'		
	2.0 Main contact permanently 'OFF'	1.1 Frequency at specified voltage less than 30 flashes per minute	1.1 Frequency at specified voltage between 30 to 60 flashes per minute
	3.0 Main contact operation erratic	1.2 Frequency at specified voltage greater than 150 flashes per minute	1.2 Frequency at specified voltage between 120 to 150 flashes per minute
	4.0 Pilot contact permanently 'ON'	2.0 Percentage 'ON' time	2.0 Percentage 'ON' time
	5.0 Pilot contact permanently 'OFF'	2.1 Percentage 'ON' to total cycle time less than 30 percent	2.1 Percentage 'ON' to total cycle time between 25 to 30 percent
	6.0 Pilot contact operation erratic	2.2 Percentage 'ON' to total cycle time greater than 75 percent	2.2 Percentage 'ON' to total cycle time between 70 to 80 percent

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